

7,7  
HW

23, 25, 26, 31

p 387 - 388 17, 20, ~~22, 24, 26~~ 35, 41, 45

17.  $f(x) = x + 9$

$g(x) = x - 9$

$(f+g)(x) = 2x$

$(f-g)(x) = x + 9 - (x - 9) = 18$

$(f \cdot g)(x) = (x + 9)(x - 9) = x^2 - 81$

$\left(\frac{f}{g}\right)(x) = \frac{x+9}{x-9} \quad x \neq 9$

20.  $f(x) = x^2 + 6x + 9$

$g(x) = 2x + 6$

$(f+g)(x) = x^2 + 8x + 15$

$(f-g)(x) = x^2 + 4x + 3$

$(f \cdot g)(x) = (x^2 + 6x + 9)(2x + 6) = 2x^3 + 6x^2 + 18x + 54 + 12x^2 + 36x$

$\left(\frac{f}{g}\right)(x) = \frac{x^2 + 6x + 9}{2x + 6}$

$2x^3 + 18x^2 + 54x + 54$

$\frac{(x+3)^2}{2(x+3)} = \frac{(x+3)}{2} \quad x \neq -3$

23.  $f = \{(1, 1), (0, -3)\}$   $g = \{(1, 0), (-3, 1), (2, 1)\}$

$f \circ g = \{(1, -3), (-3, 1), (2, 1)\}$

$g \circ f = \{(1, 0), (0, 1)\}$

25.  $f = \{(3, 8), (4, 0), (6, 3), (7, -1)\}$   $g = \{(0, 4), (8, 6), (3, 6), (-1, 8)\}$

$f \circ g = \{(0, 0), (8, 3), (3, 3)\}$

$g \circ f = \{(3, 6), (4, 4), (6, 6), (7, 8)\}$

$$26. f = \{(4,5)(6,5)(8,12)(10,12)\}$$

$$g = \{(4,6)(2,4)(6,8)(8,10)\}$$

$$f \circ g = \{(4,5)(2,5)(6,12)(8,12)\}$$

$$g \circ f = \text{DNE}$$

$$31. g(x) = x+2 \quad h(x) = x^2$$

$$[g \circ h](x) = x^2 + 2$$

$$[h \circ g](x) = (x+2)^2 = x^2 + 4x + 4$$

$$33. f(x) = 4x \quad g(x) = 2x-1 \quad h(x) = x^2+1$$

$$35. f[g(-1)] = (2)(-1)-1 = -3$$

$$f(-3) = -12$$

$$41. h\left(f\left(\frac{1}{4}\right)\right) = 4 \cdot \frac{1}{4} = 1$$

$$h(1) = 1^2 + 1 = 2$$

$$45. [h \circ (g \circ f)](2) = 4(2) = 8$$

$$g(8) = 2(8)-1 = 15$$

$$h(15) = 15^2 + 1 = 226$$